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**Icing detection from geostationary satellite data over Korea and Japan using machine learning approaches**

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Icing has a significant impact on aviation safety. When an aircraft flies in clouds, supercooled water drops on the aircraft produce a thin film which is called 'icing'. This is a factor that can cause an accident when the aircraft is taking off and landing. Icing detection studies have been commonly carried out using geostationary weather satellite data. There are several existing icing detection algorithms specific to satellite sensors. In this study, we proposed a flight icing detection approach based on the GOES-R algorithm with COMS MI and Himawari-8 AHI satellite data. The proposed approach uses machine learning algorithms such as decision trees, random forest, and support vector machines. Pilot Reports (PIREPs) were used as reference data, which cover South Korea and Japan. Various atmospheric variables were used for icing detection, including cloud height, optical and physical properties of clouds. While the existing icing detection algorithms use simple thresholds to generate an icing mask, we used machine learning approaches to produce a more accurate icing mask. The improved icing detection method optimizes the thresholds associated with the atmospheric variables by empirically considering data characteristics, when compared to the existing algorithms whose thresholds are determined based on theoretical and physical properties of icing. Quantitative assessment of the proposed approach and the existing ones was conducted using PIREPs data. The proposed icing detection algorithm is expected to help prevent aviation accidents from icing.